Longterm Discovery and Modeling of Temporal Phenomena to Support Robotic Service Behaviors

Completed Technology Project (2017 - 2021)

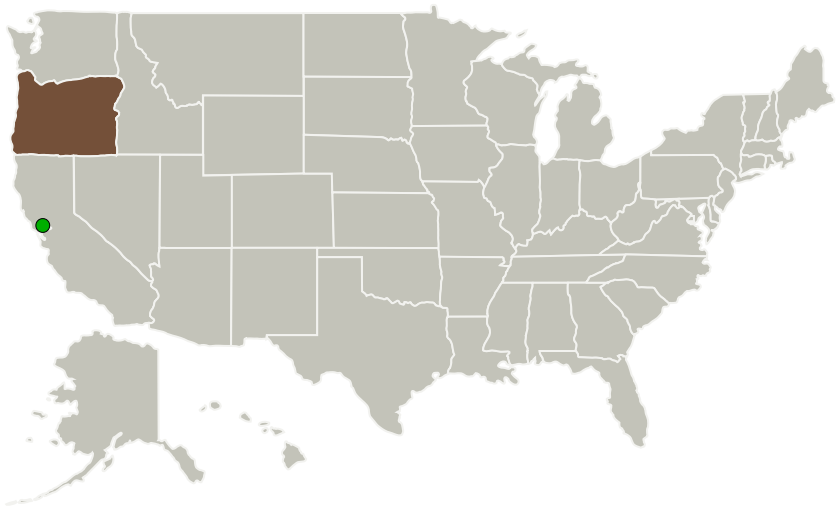
Project Introduction

In this proposal, I present a research plan for active exploration and modeling of temporal phenomena to support service robots in longterm deployment settings, such as space station assistive robots like Astrobee. Under this framework, an autonomous robot will plan data collection activities around user-scheduled tasks and routine behaviors, which will be used to construct contextual models of temporal phenomena informing successful task execution. Such modeling will be used, for example, to guide efficient search for objects in inventory management tasks, taking into account likely locations across time, as well as inform when sensor readings should be taken for monitoring system health. Over an extended deployment, the robot will plan data collection over insufficiently modeled contexts to learn an increasingly robust model over time. Additionally, information gathering activities will be scheduled alongside normal tasks in a manner that allows for maximal task efficiency.

Anticipated Benefits

Examples of potential applications include EVA robotic assistants and personal satellite assistants.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Oregon State University	Lead Organization	Academia	Corvallis, Oregon
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
Oregon

Project Website:

https://www.nasa.gov/strg#.VQb6T0jJzyE

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Oregon State University

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

Hung D Nguyen

Principal Investigator:

William Smart

Co-Investigator:

Christopher Eriksen

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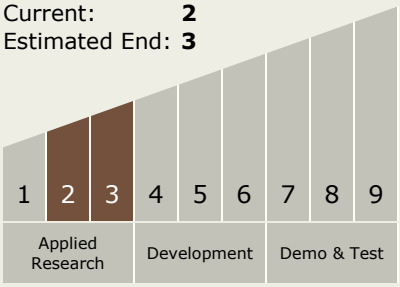
Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.7 Learning and Adapting

Target Destinations

Earth, The Moon, Mars